UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Southwest Fisheries Science Center
8604 La Jolla Shores Drive
La Jolla, CA 92037

24 July, 2003

FINAL CRUISE INSTRUCTIONS

NOAA Ship: NOAA Ship *David Starr Jordan*

Cruise Number: DS-03-06

Cruise Dates: 31 July - 10 December, 2003

Cruise Title: *Stenella* Abundance Research Project (STAR 2003)
The project is a marine mammal assessment survey with two vessels. The activities of the other vessel, NOAA Ship *McArthur* are covered under a separate Announcement.

Study Area: The Eastern Tropical Pacific Ocean (ETP)

Itinerary:
Due to the current restrictions on posting port information for U.S. Government ships, we are unable to display the itinerary in this version of the Final Cruise Instructions. For the same reason, waypoints (Appendix II) are also not included in this version. General tracklines can be displayed, and are included in Appendix 1.

Sponsoring Institution**:** NOAA/NMFS, Southwest Fisheries Science Center (SWFSC)
Protected Resources Division (PRD)

Cruise Description and Objectives:

The primary objective of the *Stenella* Abundance Research cruise is to investigate trends in population size of those dolphin stocks most affected by the Eastern Tropical Pacific tuna purse-seine fishery. The project takes a multidisciplinary approach. Data on cetacean distribution, school size and school composition are collected to determine dolphin abundance. Oceanographic data are collected to characterize habitat and its variation over time. Data on distribution and abundance of seabirds, flyingfish, and marine turtles will further characterize the ecosystem in which these dolphins live. Photographs of dolphin schools taken from a helicopter indicate school size, proportion of calves, and school structure. Skin biopsies of cetaceans provide a database for investigations of stock structure and phylogenetic relationships. Photographs document geographic variation in dolphins, and distribution of individual large whales.

Chief Scientist: Dr. Lisa T. Ballance, SWFSC (858) 546-7173, Lisa.Ballance@noaa.gov

PLAN OF OPERATIONS

1.0 DAYLIGHT OPERATIONS

1.1 Cetacean Survey - Line-transect survey methods will be used to collect abundance data. At the beginning of each day search effort should start on the trackline. The *Jordan* should travel at 10 knots (through the water) along the designated trackline. While on search effort, if the ship's speed through the water should deviate from this by more than one knot, the bridge personnel will notify the mammal team on watch or the Cruise Leader. A daily watch for cetaceans will be maintained on the flying bridge during daylight hours (approximately 0600 to 1800) by 6 mammal observers. Each observer will work in 2-hour rotations, manning each of the following 3 stations on the flying bridge for 40 minutes: a port side 25x150 binocular station, a center line data recorder position, and a starboard 25x150 binocular station.

1.1.1 Logging of Data - A log of observation conditions, watch effort, sightings, and other required information will be entered into a computer, hooked up to the ship's GPS (for course, speed and position information) and SCS (for weather and heading information). An “independent observer” may keep a separate watch of animals sighted during the cetacean survey operations, to be compared later with the observer team’s data.

1.1.2 Breaking Trackline - On sighting a marine mammal school or other feature of biological interest, the Cruise Leader or marine mammal observer team on watch will request that the vessel be maneuvered to approach the school or feature for investigation. When the ship approaches a school of dolphins, the observers will make independent estimates of school size. Biopsy and photographic operations may commence from the bow, based on directions from the Cruise Leader or Senior Marine Mammal Observers. In some instances, the Cruise Leader will request the deployment of a small boat for biopsy, photographic or other operations (see 1.3).

It may occasionally be necessary to divert the ship's course from the established trackline during regular effort due to glare or adverse sea conditions. Under these circumstances, the ship may divert up to 30 degrees from the established course. This deviation may continue until the ship is 10 nm from the trackline, at which point the ship should turn back toward the trackline.

1.1.3 Resuming Effort - When the observers have completed scientific operations for the sighting, the ship will resume the same course and speed as prior to the sighting. If the pursuit of the sighting has taken the ship more than 10 nm from the trackline, the observers should be notified. The Cruise Leader or Senior Marine Mammal Observers may request that, rather than proceed directly toward the next waypoint, the ship take a heading of 20 degrees back toward the trackline.

1.2 Seabird Survey - Visual surveys of seabirds will be conducted from the flying bridge during daylight hours by two seabird observers. A log of sighting conditions, effort, sightings, and other required information will be entered into a computer interfaced with the ship’s GPS (for course, speed, and position information) and SCS (for weather and heading information). Seabird observers will use both handheld and 25x150 binoculars.

1.3 Small Boat Work - A small boat may be necessary for biopsy sampling, photography, seabird collection, island surveys or marine turtle work. Deployment will be requested by the Cruise Leader on an opportunistic basis, possibly multiple times in a single day, providing the Commanding Officer concurs that operating conditions are safe. Unless the Commanding Officer allows otherwise, the small boat will remain within sight and radio contact at all times while deployed

1.4 Biopsy Sampling – Biopsy samples for genetic analyses of marine mammals will be collected on an opportunistic basis. Necessary permits will be present on the vessel. The animals to be sampled will either be approached by the research vessel during normal survey operations, will approach the vessel on their own, or will be approached by a small boat. Samples will be collected, from animals within 10 m to 30 m of the bow of the vessel, using a dart fired from a crossbow or rifle. With the exception of the small boat and safety apparel, all necessary gear will be furnished and deployed by the

scientific party.

1.5 Photography - Photographs of marine mammals will be taken on an opportunistic basis. These will be used to study social behavior and movement patterns of identified individuals, and to study geographic variation. Necessary permits will be present on the vessel. The animals to be photographed will either be approached by the research vessel during normal survey operations, will approach the vessel on their own, or will be approached by a small boat. With the exception of the small boat and safety apparel, all necessary gear will be furnished by the scientific party.

1.6 Seabird Collection - A shotgun and ammunition may be used to collect seabirds on an opportunistic basis. A small boat may be required for specimen collection. Necessary permits will be present on the vessel. Weapons and ammunition will be turned over to the Commanding Officer immediately upon boarding and stored in the gun locker.

1.7 Marine Turtle Research - A visual survey for marine turtles will be carried out by the mammal and seabird observers on the flying bridge during all daylight hours. Data will be recorded in both mammal and seabird databases. Marine turtles will be captured, either from the research vessel using a long-handled net, or from a small boat, on an opportunistic basis at the discretion of the Cruise Leader. Turtles will be measured, weighed, tagged, and a small amount of blood may be collected for genetic analysis and hormonal studies. Turtles may be examined with ultrasonography to check reproductive condition. All turtles will be subsequently released. At the discretion of the Cruise Leader, one or more turtles may be fitted with a satellite transmitter and released. The transmitter will be attached to the carapace with fiberglass resin. Also at the discretion of the Cruise Leader, a stomach lavage may be performed on select turtles. With the exception of the small boat and safety apparel, all necessary gear will be supplied and operated by the scientific party. All necessary permits will be aboard the vessel.

1.8 Seabird Colony Censuses - Nesting site surveys may be conducted by the scientific party at locations to be determined by the Cruise Leader. The vessel's small boat(s) may be required for transporting observers to and from nesting sites for ground counts (on foot) of the seabird colonies. Potential islands include: Clipperton, France; Alijos Rocks, Mexico; San Benedicto, Mexico; Guadalupe, Mexico; Malpelo, Colombia; Cocos, Costa Rica. Growing feathers (one per bird) may be collected from up to 10 individuals from shearwater species on San Benedicto, Mexico, From up to 10 individuals of storm petrel species on Guadalupe, Mexico, and from up to 40 individuals from each of several different species on Clipperton Island, France. All necessary permits will be aboard the vessel.

1.9 Helicopter Operations - Helicopter flight operations will be required to obtain photographs for calibration of dolphin school sizes. Every day, the pilot and lead photogrammetrist will meet on the bridge at 0800 to discuss the plan of the day. The officer on watch will be involved in the meeting and pass on appropriate information to the following watch. Flight operations will be requested whenever the aerial photography team leader decides conditions are appropriate for photography, but flights will mainly be in the morning and in the afternoon, avoiding high glare conditions during mid-day. The final decision to deploy the helicopter will be that of the pilot, with input from the Commanding Officer and Cruise Leader. Flight from the ship will be conducted in accordance with the Shipboard Operations supplement to the NOAA-AOC Aircraft Operations Manual. A copy of the supplement is provided with these cruise instructions (Appendix 3), and will be included in the Cruise Leader's Manual.

The pilot can work only six days in a row before a hard down day must be declared (a flight stand-by is equivalent to a work day). A hard down day must be declared during the 0800 meeting, and the pilot will then know that he/she has the next 24 hours off. Should conditions change radically, the lead photogrammetrist can request a flight and, subject to the pilot's input, the hard down day can be canceled.

1.9.1 Pinniped Rookery Censuses - At the discretion of the Cruise Leader, photographic censuses of California sea lion rookeries may be conducted on several Mexican islands during Leg 1. Possible islands to be surveyed include: Islas Los Coronados, Isla Cedros (and Piedra Colorada), Islas San Benitos, Isla Natividad, Isla Asuncion, and Isla Santa Margarita. During these censuses the helicopter will fly a series of photographic transects over known rookery sites and will survey the shorelines for undescribed sites that are currently occupied by sea lions. The ship will be required to provide helicopter safety support. The Cruise Leader will determine when ship time is to be allocated to these activities. Censuses will be directed by the aerial photogrammetry team leader. Necessary permits will be present

on the vessel.

1.9.2 Aerial Photographic Seabird Censuses - At the discretion of the Cruise Leader, the helicopter will be used to conduct photographic censuses of seabird colonies on several islands (listed above, 1.8). As in the pinniped rookery surveys, the helicopter will fly transects over the islands and use the same photogrammetric methods. Censuses will be directed by the aerial photogrammetry team leader. Necessary permits will be present on the vessel.

1.10 Collection of Fish - Fish will be collected on an opportunistic basis at the discretion of the Cruise Leader. While underway, trolling gear will be used when conditions permit. While stationary, hook-and-line gear will be used. Fish will be measured, sexed, and stomach contents will be examined and recorded by scientific personnel. The Cruise Leader will be responsible for the disposition of the catch, in accordance with NOAA Administrative Order 202-735B, dated January 9, 1989. All flyingfish specimens that land on the decks will be collected by the scientific party and frozen. We request that any individual who finds a flyingfish on deck please notify Robert Pitman.

1.10.1 Collection for Food-web Isotope Project – Samples from the same fish collected under 1.10 will be taken for the Food-web Isotope Project. The date, location, time of day, species, length, and sex of each fish will be recorded by scientific personnel. The stomach will be removed and frozen, with stomach contents intact, after being examined under 1.10. A piece of the liver and a core of white muscle will also be removed and frozen. Approximately 10 cu ft of freezer space is required to store the samples. R. Olson, IATTC, will provide supplies and instructions.

1.11 Salvage of Marine Mammals - Marine mammal body parts may be salvaged on an opportunistic basis at the discretion of the Cruise Leader. This includes whale and dolphin ivory and carcasses. In the event that this occurs, scientific freezer space will be needed to store the mammal body parts. Permits to salvage and import marine mammal parts will be present on the vessel. All marine mammal specimens obtained will be archived at the SWFSC but may be released on extended loan to recognized research institutions according to existing guidelines.

1.12 Buoys - The ship may be required to approach equatorial buoys to repair or maintain scientific instruments for the Tropical Atmosphere Ocean (TAO) project. This will occur on an opportunistic basis at the discretion of the Cruise Leader, providing the Commanding Officer concurs that conditions are safe for such operations.

1.13 Acoustics –The scientific EK-500 depth sounder will be operated, at 38, 120 and 200 KHz and interfaced to a data acquisition system to estimate micronekton biomass between 0 and 500 m. The vessel's EQ-50 depth sounder may be used at the discretion of the Commanding Officer, but will normally remain off while underway. The ship shall inform the Cruise Leader of any use of the vessel's EQ-50, as it interferes with the signals received on the scientific EK-500. While in the core area (North of 5° N and East of 120°W), the scientific EK-500 will be used on alternate days during the visual survey periods. Otherwise, its use will be continuous or at the discretion of the Cruise Leader

1.13.1 ADCP – The ship's ADCP should run continuously and be logged to a data acquisition system. Complete system settings will be provided by the oceanographer, but will include 5-minute averaging of currents, AGC and 4 beam returns in 60 8-meter bins.

1.13.2 Sonobuoys - Sonobuoys may be deployed periodically from either the *Jordan* or a small boat on an opportunistic basis, at the discretion of the Cruise Leader. With the exception of the small boat, all of the necessary equipment will be supplied and operated by scientific personnel.

1.13.3 Bow Hydrophone – A hydrophone mounted on the bow may be activated by scientific personnel at the discretion of the Cruise Leader. All of the necessary equipment will be supplied and operated by scientific personnel.

1.14 Oceanography - Oceanographic sampling will be done by the oceanographers and other designated scientists, while underway during the day.

1.14.1 XBT Drops – There will be three XBT drops per day, at 0900, 1200 and 1500 hours local ship time, or as requested by the Cruise Leader. The XBT's will be conducted and provided by scientific personnel. If the vessel is stopped at the scheduled launch time, the drop will be delayed until the ship is again underway. If the vessel is not going to move within half an hour, the scientist performing the drop should be notified and the drop will be delayed or canceled, at the discretion of the Cruise Leader.

1.14.2 Surface Water Samples – A surface water sample for chlorophyll a analysis and a bucket temperature will be taken at 0900, 1200, 1500, and 1800 hours local ship time daily.

1.14.3 Thermosalinograph Sampling - The ship will provide and maintain a thermosalinograph (TSG), which is calibrated and in working order, for continuous measurement of surface water temperature and salinity. A backup unit (calibrated and in working order) will also be provided by the vessel and remain aboard during the cruise. A data acquisition system (WinDACS) furnished and maintained by scientific personnel will be connected to the TSG output from the Sea-Bird Electronics interface box, via a cable with a 9-pin female d-sub connection (provided by ship). This computer will receive the raw data, with the NMEA position string attached to each record. Additionally, this computer will be connected to the ship's LAN, in order to synchronize with the ship's time server. The Scientific Computing System (SCS) shall also collect this information, as specified in future cruise instructions. The oceanographer will provide the ship's Operations Officer and Electronics Technician with detailed SCS acquisition information before departure. All SCS data will be provided to the SWFSC oceanographer following each leg of the cruise.

1.14.4 Test underway CTD profiler – Occasionally during the cruise, an underway CTD profiler may be tested by the oceanographer. The system is under development at SIO and is self-contained, using a small, 110-volt electric fishing reel. The testing times will be determined by the Cruise Leader and/or ship command, so as not to interfere with the primary objective of the survey. This operation may require assistance from the deck department, which will be requested in advance by the Cruise Leader.

1.14.5 Argo Buoy deployments - 18 Argo array buoys, part of the Global Climate Observing System/Global Ocean Observing System (GCOS/GOOS) and part of the Climate Variability and Predictability Experiment (CLIVAR) and the Global Ocean Data Assimilation Experiment (GODAE), will be deployed by scientific personnel to help fill in the coverage gap in the ETP for this program. Times and locations of deployment will be determined by the Cruise Leader in consultation with the Command. Buoys will be deployed off the stern by the scientific party after notifying the bridge. Approximately 14 buoys will be transferred from the *McArthur* to the *Jordan* during the Costa Rica in port (if interior space prior to departure is not available aboard the *Jordan*).

2.0 NIGHT OPERATIONS

A chronological record of oceanographic and net tow stations will be kept by the ship (Marine Operations Log) with dates and times in GMT. The ship will provide a printed copy of the electronic marine operations log (with the cruise Weather Log and SCS data) to the SWFSC oceanographer at the completion of the cruise. The main SeaBird CTD system will be provided and operated by the scientific party. The collection of oceanographic data, samples and their processing will be conducted by the scientific party. The crew of the vessel will operate all deck equipment and be responsible for the termination (and any necessary reterminations) of the CTD cable pigtail (provided by the scientific party) to the conducting cable of the winch. The ship shall provide a complete backup system, consisting of a frame with weights, 12-place rosette and deck unit, and SeaBird 9/11+ CTD with conductivity and temperature sensors. All instruments, their spares and spare parts provided by the ship must be maintained in working order and, if applicable, have current calibrations (within previous 12 months).

2.1 CTD Stations - Two CTD stations will be occupied each night. CTD data and seawater samples will be collected using a SeaBird 9/11+ CTD with rosette (General Oceanics) and Niskin bottles fitted with silicone tubing and o-rings (supplied by oceanographer). All casts are to 1000 meters, with the

descent rate at 30m/min for the first 100m of the cast, then 60m/min after that, including the upcast between bottles. From each cast, chlorophyll samples (to 200 m) and salinity samples (500 and 1000 m or bottom) will be collected and processed on board. The 265ml chlorophyll samples will be filtered onto GF/F filters, placed in 10ml of 90% acetone, refrigerated for 24 hours, and then analyzed on a Turner Designs model 10AU field fluorometer. Nutrient samples (0 - 500 m) will be collected, frozen, and stored on board. Cast times are subject to change since sunrise and sunset will vary during the cruise. Additional CTD stations may be requested by the Cruise Leader in areas of special interest.

2.1.1 Pre-Daylight cast - The morning cast (1000 m) will begin approximately one and one-half hours prior to sunrise. This exact starting time will be determined the evening before, by the FOO or Deck Officer. The time should not be changed more than 15 min. from the previous day, even if sunrise changes more than this. This schedule may be modified by the oceanographer. Niskin bottle water samples will be collected at seven light depths and five additional standard depths, between the surface and 1000 meters. These depths will be determined just prior to each cast by entering the ship's position into a computer program. Primary productivity will be measured by radioactively labeled carbon uptake methods. The seven samples in bottles will be spiked with ^{14}C, incubated on deck for 24 hours, filtered, and stored for later analysis at the SWFSC. The Niskin bottles (#1-7) will be rinsed after each cast and acid-washed at the end of each leg. In San Diego, the oceanographers will be trained by SWFSC personnel, in the use of radioactivity prior to departure. A copy of the SWFSC's NRC license for the use of radioisotopes will be kept on board. All radioactive waste will be stored in secured drums and boxes, and returned to San Diego (i.e. no disposal of radioactivity at sea).

2.1.2 Post Effort Cast - An evening CTD cast, to 1000 meters, will be conducted a minimum of one hour after sunset. The exact time will be determined by the Deck Officer (by 1800 local ship time that day). Bottle samples will be collected from 12 standard depths (0, 20, 40, 60, 80, 100, 120, 140, 170, 200, 500, 1000 m). Samples for chlorophyll, nutrients and salts will be taken as listed above (except the addition of four salinity samples taken from every other evening cast).

2.2 Filtering water samples - Concurrent with the evening CTD station,small samples of particulate organic matter (POM) and zooplankton will be collected by the oceanographer from the ship's uncontaminated seawater system for the Food-web Isotope Project. Seawater will be collected, placed in a pressurized carboy filtration system, and left for approximately an hour. For POM collection, the water will be pre-filtered to remove large particles, then filtered from the carboy on to 25-mm glass fiber filters. The glass fiber filters will be stored frozen. For zooplankton collection, seawater collected from the sea surface will be poured over a home-made nitex filter and stored frozen. R. Olson, Inter-American Tropical Tuna Commission (IATTC), will provide the sampling equipment and instructions for this and other sampling for the Food-web Isotope Project.

2.3 Net Sampling: Net tows will be conducted by the scientific party with the assistance of a winch operator from the vessel. The schedule for these tows may vary by leg and may need to be modified by the Cruise Leader.

2.3.1 Dipnetting – Concurrent with the evening CTD station, dipnetting for surface fauna will be conducted by scientific personnel, for one full hour, from the starboard side of the ship. This station is to begin no sooner than one full hour after sunset. One or more deck lights will be necessary to illuminate the water surface in the area of dipnet sampling. Samples will be preserved, labeled, and stored in the vessel's freezer. Scientists may also collect surface fauna for aquaria on board. All live organisms will be donated to the Birch Aquarium upon return to San Diego.

2.3.1.1 Dipnetting for Food-web Isotope Project – Surface fauna collected under 2.3.1 may be shared with the Food-web Isotope Project, at the discretion of the Cruise Leader and the scientist directing this activity. Samples will be labeled and stored in the vessel's freezer.

2.3.2 Manta Tow - A surface manta net tow will be conducted for fifteen minutes immediately following the post-sunset CTD station and dipnetting. Estimated completion time for the entire procedure is 30 minutes. The net should be deployed from the starboard hydro winch. Samples will be preserved in formalin, labeled, and stored in containers provided by the SWFSC until the vessel returns to San Diego.

2.3.3 Bongo Tow - An oblique Bongo tow will be conducted after the Manta tow (45 minute station time), to a depth of 200 meters (wire out 300m on starboard hydro winch). Samples will be preserved in formalin, labeled, and stored in containers provided by the SWFSC until the vessel returns to San Diego.

2.4 Transit - When scientific operations are complete for the night, the ship will resume course along the trackline, at a speed determined by the Cruise Leader, until it is necessary to stop for the morning (pre-daylight) CTD station.

3.0 SCIENTIFIC PERSONNEL

3.1 Chief Scientist - The Chief Scientist is Dr. Lisa T. Ballance, SWFSC, at phone (858) 546-7173. The Cruise Leader is the authorized representative of the Chief Scientist, with all the designated powers and responsibilities of the Chief Scientist.

The Chief Scientist is authorized to alter the scientific portion of this cruise plan with the concurrence of the Commanding Officer, provided that the proposed changes will not: (1) jeopardize the safety of personnel or the ship, (2) exceed the time allotted for the cruise, (3) result in undue additional expense, or (4) change the general intent of the project.

3.2 Participating Scientists
Please see Appendix 4.

3.3 Personnel Switches - There will be two teams of marine mammal observers for the cruise. Each team will spend one-half of the cruise on board each ship, so as to have equal calibration time with the helicopter aboard the *David Starr Jordan*. The exchange of observer teams will take place during the inport in Puntarenas, Costa Rica. The transfer of observers and their personal gear will occur on the day of arrival into port (30 September).

For all legs, the incoming scientific personnel will board the ship on the day of its arrival in port, the outgoing personnel will stay in a hotel or make other plans.

3.4 Passports - Each member of the scientific party will have a valid passport for the cruise. Permanent SWFSC personnel will have a government passport and orders for official travel (which includes any time on the ship) and a personal passport for recreational travel. All personnel will have a birth certificate (or copy) or picture identification aboard as a backup for the passport, for issuance to and from foreign ports. All scientific personnel will have government identification cards.

3.5 Medical Forms - All scientific personnel will complete a NOAA Health Services Questionnaire (NHSQ) prior to embarking, as per NC Instruction 6000. This form will be routed through MOP Health Services 30 days prior to the cruise.

4.0 EQUIPMENT

4.1 Supplied by scientific party:

1. Nine 7x50 hand-held binoculars
2. Four 25x150 binoculars and stands
3. One 20x60 hand-held gyro-stabilized binoculars
4. Three observer chairs for flying bridge
5. Wooden decking for flying bridge
6. Video camera and tapes
7. One Digital EOS SLR camera, and 2 35mm cameras with lenses, 35mm film
8. Three handheld radios
9. Laptop computers (2 - 3) for scientific party e-mail use

10. 2 desktop computers mounted below decks with CAT5 KVM extension units at CPUs and at remote console units on the flying bridge.
11. Portable GPS component
12. Helicopter, spare parts, and tools
13. Aerial cameras, film and assorted gear (including 2 laptop computers)
14. Large freezer (app. 6' x 2.5' x 3') for film storage (photogrammetry)
15. 10 -10 ft sections of PVC pipe for helicopter radar altimeter calibration
16. Shotgun and ammunition (for seabird collection)
17. Crossbows, biopsy darts and tips, sample vials and storage solution (DMSO with MSDS);
18. Rifles, 9mm blank charges; 1 notebook computer for biopsy data entry and thermal label printer
19. Turtle capture device and sampling gear
20. Calipers, flipper tags and applicators, scale, and blood collection equipment for turtle research
21. Ten satellite transmitters for turtles (must be stored in freezer)
22. Fiberglass resin, catalyst, cloth and supplies for attaching turtle transmitters
23. Laptop computer and comm. box for programming turtle satellite transmitters
24. Telonics handheld receiver (400-465 MHZ) for turtle satellite transmitters
25. Ultrasound machine for turtles
26. 5 automobile tires for holding turtles
27. Small bench top centrifuge for turtle blood
28. Two long-handled dipnets and sample containers
29. 2 gimbaled 20 gal aquarium tanks (for inside use)
30. 2 50-gallon aquarium tanks (for outside use)
31. Formalin and sodium borate
32. Manta tow frame, net (and spares) and glass sample containers
33. Bongo nets (including spare) and frame and glass sample containers
34. XBT probes (Deep Blues) - 30 cases ($1^{1}/_{9}$ pallets) to be stored in fish boxes and lab spaces
35. Computers for environmental (WinDACS) and acoustic (ADA) data acquisition (spare)
36. SeaBird 9/11+CTD system including G.O. rosette and 1.7L Niskin bottles (15)
37. Fluorometer (TD10AU) and one backup (TD10) for discrete chlorophyll *a* analysis
38. Lab apparatus, logs and supplies for discrete chlorophyll *a* analysis
39. Wormley standard seawater vials for salinometer calibration (40 vials)
40. Salinity sample bottles, square w/plastic insert beneath screw cap (54 ea. -2 cases of 24 plus 6 spares)
41. Acetone, B-phenethylamine, scintillation cocktail, hydrochloric acid, Triton x-100
42. ^{14}C-bicarbonate (15 mCi total) and copy of NRC Materials License 04-29022-01
43. Primary productivity incubator (approx. 2' x 2' box, 48" high)
44. Nutrient and productivity sample vials
45. Small refrigerator for ^{14}C stock solution and for chlorophyll sample extraction
46. Fish boxes, two for oceanography storage (XBTs & net tow jars)
47. Bucket thermometer holder and thermometer (and 2 spares)
48. Safety (MSDS's) and clean up materials for ^{14}C and all chemicals, incl. a Geiger counter
49. Oceanographic data logs and log books
50. 1 pallet of sonobuoys (5'x5'x5', 1200 lbs when full)
51. Two sonobuoy receivers
52. DAT recorder and laptop PC for sonobuoys
53. Permits for specimen collection and foreign research
54. Computer data storage media (diskettes, etc.)
55. 5 reams of paper
56. Underway CTD
57. Salinometer (Autosal 8400), and spare, for use in constant temperature room (20-22 deg. C)
58. Argo buoys (11)
59. Bow mounted hydrophone (to be mounted by ship's personnel)

4.2 Supplied by ship - We request the following systems and their associated support services, sufficient consumables, back-up units, and on-site spares. All measurement instruments are assumed to have current calibrations and we request that all pertinent calibration information be included in the data package.

1. Insulated CAT5 cable running from location site for CPUs to the flying bridge consoles.

2. Power, ship's GPS, and ship's SCS connections to CPUs running the flying bridge consoles
3. Canopy on flying bridge
4. Three handheld radios (as spares)
5. Small boat for biopsy sampling, photography, seabird collection, seabird colony censuses
1. and marine turtle research
6. Helipad, fuel system, and safety equipment for helicopter operations
7. Dry incubator storage space for helicopter parts
8. Lab Space for a chest freezer for helicopter film (aft lab, port side)
9. Deck lighting for dipnetting
10. Freezer space for water and biological samples (-70^{o} freezer and walk-in)
11. Hydrographic winch with minimum 400m cable (1/4" to 3/8" dia.) for net tows
12. Termination for SeaBird CTD cable (including Chinese finger and shackle)
13. Bottom depth checking during CTD casts and net tows in depths less than 2000m.
14. Back-up SeaBird 9/11+CTD system and G.O. rosette, frame with weights, spare 1.7L Niskins (12)
15. Oceanographic winch with 5/16" conducting wire
16. SeaBird thermosalinograph (SBE21) and connection (9-pin female D-sub for WinDACS)
17. SEAS or Sippican system with XBT launcher (prefer aft deck launch)
18. Storage space on aft deck for 30 boxes of XBTs (in 2 fish boxes 48"x44"x30" stored fwd of helo pad)
19. Scientific Computing System for data collection (redundant to WinDACS system)
20. Simrad EQ50 echo sounder and input cables in SIC room
21. Simrad EK500 scientific sounder and data logging system with 38, 120, and 200 KHz transducers
22. Constant temperature room (20-22^{o}C)
23. Salinity sample bottles (48 ea. - 2 cases of 24 plus spares) (note: currently at SWFSC)
24. Clean rust-free seawater for primary productivity incubator and fish tanks on aft deck
25. Space for primary productivity incubator (2'x2') and fish tanks (25ft^{2}) on aft deck, port side
26. Hook-up (CTD) and counter space for SWFSC-supplied oceanographic computer
27. Deck space for 2 manta frames (one spare), two bongo net frames (one spare)
28. RDI 150-kHz ADCP and data acquisition system.
29. Marine Operations and Deck Log (electronic)/Weather Observation sheets, filled out by Deck Officers
30. Installation of SWFSC-supplied sonobuoy antenna and coax cable
31. Exterior storage space for 1 pallet of sonobuoys (see item 50, Equipment Supplied By the Scientific Party)
32. Copy Machine
33. Additional email computer for scientific email use in dry Lab.
34. Network access for photogrammetry computer in Seawater Lab
35. Storage space (prefer weather protected) for 11 Argo buoys (each in 17"x17"x85" boxes)
36. Network access to a printer for biopsy sampling computer
37. Lab space with power and water available for operation of the portable genetics lab

4.3 Installation and Maintenance - The helicopter pad will be installed aboard *Jordan* during the port call preceding the cruise by ship and Aircraft Operations Center (AOC) personnel.

Prior to departure from San Diego the Chief Scientist and members of the scientific party may board the vessel, with permission of the Commanding Officer, to test survey equipment and environmental sensors, set up equipment, and assemble and modify wooden decking on flying bridge.

During the cruise, the temperature of the freezer and the refrigerator must be monitored by the ship's engineering staff twice daily, and the Cruise Leader notified in the event of significant changes.

4.4 Radioisotopes - Small amounts of ^{14}C radioisotope will be used in the primary productivity experiments to be conducted within the oceanographic laboratory of *David Starr Jordan* and in a labeled tank on the aft deck. The use of these radioisotopes is authorized by, and will be in accordance with, the conditions of U.S. Nuclear Regulatory Commission, under the State of California Radioactive Materials License number 04-29022-01, issued to SWFSC. The Application for Authorization to use Radioactive Material on NOAA Ships will be provided to the Pacific Marine Center according to the current NOAA Radioactive Material policy. Valerie Andreassi, Kerry Kopitsky, Dave Griffith, Ron Dotson and Amy Hays are Authorized Users for radioisotopes. In accordance with this license, these radioactive

materials are authorized for use at sea without geographic restriction. A copy of the license will be carried aboard the ship.

The Cruise Leader will ensure that a wipe test of all areas and surfaces exposed to chemicals that contain ^{14}C is conducted by oceanographic personnel at the end of each leg, after any spillage, and after the cruise. The results of this wipe test shall be forwarded to the Director, Pacific Marine Center and Commanding Officer, NOAA Ship *David Starr Jordan*.

The Chief Scientist shall submit operating and emergency procedures prior to commencing the project. These should include instructions on handling, controlling access to the material, monitoring laboratory contamination, providing notification requirements, keeping records, and decontaminating facilities and personnel.

4.5 Hazardous Materials - The Chief Scientist shall be responsible for complying with NC Instruction 6280a, Hazardous Materials and Hazardous Waste; policy, guidance, and training, dated February 4, 1991, paragraph 7.g and paragraph 9. By Federal Law, the ship may not sail without a complete inventory of Material Safety Data Sheets (MSDS's) and appropriating neutralizing agents, buffers, and/or absorbents in amounts adequate to address spills of a size equal to the amount of chemicals brought on board. The Chief Scientist will provide the Commanding Officer with a copy of all MSDS's prior to the cruise.

5.0 DATA RESPONSIBILITIES

5.1 Collection of Data - The Chief Scientist will receive all original data related to the project. The Chief Scientist will in turn furnish the Commanding Officer with a complete inventory listing of all data gathered by the scientific party, detailing types of operations and quantities of data prior to departing the ship. All data gathered by the vessel's personnel that are desired by the Chief Scientist will be released to her, including supplementary data specimens and photos gathered by the scientific crew.

5.2 Dissemination of Data - The Chief Scientist is responsible for the quality assurance, disposition, and archiving of data and specimens collected aboard the ship. The Chief Scientist is also responsible for the dissemination of copies of these data to cruise participants and to any other requesters. The SWFSC cruise report will be submitted according to SWFSC procedures to appropriate persons and groups.

5.3 Foreign Research Clearance Reports - A request for research clearance in foreign waters has been submitted by SWFSC. The Chief Scientist is responsible for satisfying the post cruise obligations associated with diplomatic clearances to conduct research operations in foreign waters.

5.4 Evaluation Form - The Chief Scientist will complete the Ship Operations Evaluation Form and forward it to the Office of Marine and Aviation Operations. The Commanding Officer will provide this form.

6.0 ADDITIONAL INVESTIGATIONS AND PROJECTS

6.1 Ancillary Projects - Ancillary projects are secondary to the objectives of the cruise, should be treated as additional investigations, do not have representation aboard, and are accomplished by the ship's force. Ancillary tasks will be accomplished in accordance with the NOAA Fleet Standing Ancillary Instructions. Any additional work will be conducted so as not to interfere with operations as outlined in these instructions. The Chief Scientist will be responsible for determining the priority of additional work relative to the primary project with approval from the Commanding Officer.

7.0 COMMUNICATIONS

7.1 Radios - The Cruise Leader or designee may request, from the Commanding Officer, the use

of radio transceivers aboard the ship to communicate with other vessels and aircraft, if necessary.

SWFSC will supply their own handheld radios for intra-ship communication and communication with the small boats. However, the Cruise Leader may request the use of the ship's handheld radios if the supplied radios should fail.

7.2 Telephone - The Cruise Leader or designee may require access to the ship's INMARSAT or cellular telephone systems with permission from the Commanding Officer. The Commanding Officer will provide the Cruise Leader with a log of all INMARSAT calls made from the ship for SWFSC business at the end of each leg. In accordance with the Communications Reimbursement Policy, SWFSC will pay these charges via a transfer of funds from SWFSC to the ship.

7.3 Electronic Mail - All members of the scientific party will have access to e-mail for communications with persons not aboard the ship. The amount of such communication traffic will be determined by the Chief Scientist.

E-mail communication between the *Jordan* and *McArthur* is essential and will be assumed to be in working order. Voice communications between scientific personnel on the two ships may be required at the discretion of the Cruise Leader. A regular communication between the vessels may be requested.

7.4 Routine Reports - The Cruise Leader will submit a weekly cruise report, along with time and attendance for the scientific party, to the Survey Coordinator each Thursday during the cruise via e-mail or, if e-mail is not functioning properly, via fax. The Survey Coordinator at SWFSC will be on the distribution list for the ship's noon position reports.

8.0 MISCELLANEOUS

8.1 Pre-cruise Meeting - A pre-cruise meeting between the Chief Scientist (and her staff) and the Commanding Officer (and his staff) will be held prior to the start of the cruise to identify operational requirements (*i.e*. overtime, modifications, repairs, or procurements). The date and time for this meeting is yet to be scheduled.

8.2 Underway Meetings - Meetings between the Commanding Officer (and other officers) and the Cruise Leader should occur at the beginning and end of each leg to discuss and solve any problems or changes that may arise. Additional meetings should occur as needed.

8.3 Debrief - A post-cruise debriefing will be held between the Chief Scientist and the Commanding Officer. If serious problems are identified, the Commanding Officer shall notify the Marine Operations Center, Pacific, in the most direct means available. The Chief Scientist shall document identified problems in the Ship Operations Evaluation Form. The time and date for the debrief will be determined toward the end of the cruise.

8.4 Time and Attendance - Time and Attendance will be filled out by the SWFSC timekeeper while the ship is at sea, based on information transmitted by the Cruise Leader to the Survey Coordinator. Scheduled overtime is authorized for Saturdays, Sundays and holidays. Irregular overtime will be authorized by the Cruise Leader as required. SWFSC personnel are authorized per diem at the rate of $2.00 per day to be paid via a travel voucher at the termination of the cruise. Photogrammetry personnel are authorized hazardous duty pay. Task Number 2003 30-51-0002-00-00-00-00 A8L5S1H-P29 will pay for per diem and overtime for any SWFSC permanent, term, or temporary employees: Cruise Leaders, Marine Mammal and Seabird Observers, photogrammetrists, and oceanographers. Regular salary for these personnel will be paid by the CYOP task from which they are normally paid.

Time and Attendance for Aquatic Farms contract employees will be based upon a pre-determined schedule. If events of the cruise alter the planned schedule, the Cruise Leader will notify the Survey Coordinator, and appropriate changes will be brought to the attention of Aquatic Farms.

8.5 Navigation - Primary control will be GPS, also dead reckoning based on visual bearings and radar ranges when possible.

8.6 Scientific Spaces - The Cruise Leader shall be responsible for the proper upkeep and cleaning of all spaces assigned to the scientific party, both laboratory and living spaces, throughout the cruise. The Cruise Leader or Chief Scientist will make berthing assignments for scientific personnel on a per-leg basis, with approval of the Commanding Officer.

For further information contact LTJG Jason Appler, Survey Coordinator, Southwest Fisheries Science Center, National Marine Fisheries Service, NOAA, 8604 La Jolla Shores Drive, La Jolla, CA 92037; Phone (858) 546-5672. More information about the cruise and project can also be found at the STAR website: http://swfsc.nmfs.noaa.gov/prd/star/default.htm

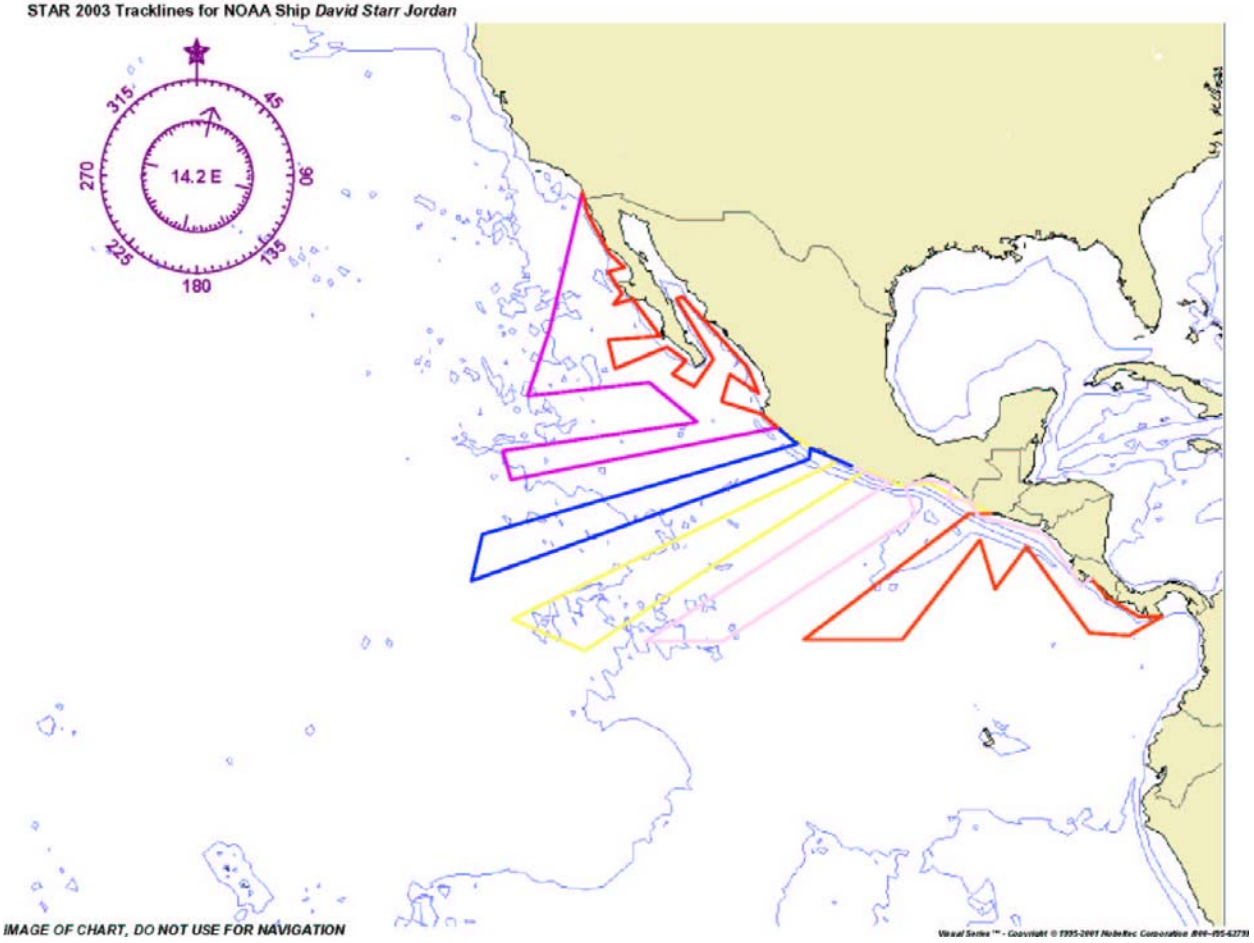
Prepared by: /S/ Dated: 25-July - 2003
LTJG Jason Appler
Survey Coordinator, SWFSC

/S/ Dated: 25-July - 2003
Dr. Lisa T. Ballance
Chief Scientist, SWFSC

Approved by: /S/ Dated: 25-July - 2003
Dr. Michael Tillman,
Science Director, F/SWR

Appendix 1

STAR 2003 Tracklines for NOAA Ship *David Starr Jordan*



APPENDIX 3

SHIPBOARD HELICOPTER OPERATIONS
(From NOAA-AOC Aircraft Operations Manual)

I. ADMINISTRATION.

A. BACKGROUND. This instruction provides uniformity and standardization when operating aboard NOAA helicopter capable ships. All personnel involved in flight operations aboard these ships will become familiar with the following instruction.

B. POLICY. **The Aircraft Commander is the sole authority on every aspect of helicopter operations**. Due to the inherent dangers associated with shipboard helicopter operations, it is imperative that all personnel be aware of the hazards and constraints that define the limits of safe operations and receive adequate training in order for operations to be conducted safely and smoothly. The practices and methods described here should provide sufficient guidance for most operating conditions.

II. GENERAL OPERATION POLICY.

A. MINIMUM CREW. The helicopter detachment shall consist of sufficient personnel so as to support the mission as dictated by the Chief Scientist. Ordinarily the detachment will consist of one pilot (Aircraft Commander) and one helicopter mechanic as a minimum.

B. AIRCRAFT COMMANDER. The duties of the Aircraft Commander while onboard ship are as follows:

1. **Shall have the sole authority for conducting flight operations.**

2. To conduct training with all project pilots and ship's flight operations crewmembers to go over helicopter operations.

3. Act as technical advisor to the Commanding Officer of the vessel on all matters concerning aviation and flight safety.

4. Provide helicopter support for the mission as required by the Chief Scientist.

5. Conduct training flights as required to maintain pilot proficiency.

6. Coordinate scheduled maintenance with mission requirements.

7. Ensure all personnel who are scheduled to fly in the helicopter are properly briefed prior to flight.

8. Ensure a weight/balance and performance card has been filled out and a preflight has been performed prior to flight.

9. Ensure a post-flight and debriefing has been performed and all flight and maintenance logs are filled out after flight.

10. Provide for the security of the helicopter at all times by ensuring no unauthorized personnel are on the flight deck without escort by one of the detachment personnel.

11. Ensure a sitrep is completed and sent via e-mail to aoc.sitrep@aocnt3.aoc.noaa.gov on a daily basis, whether the helicopter is flown or not. During the ferry flight, if unable to e-mail call (800)729-6622 X3018 and leave the information contained in appendix (a).

12. Ensure the monthly report is completed and sent via e-mail (aoc2.projects@noaa.gov) or sent to the Aircraft Operations Center as per appendix (b) so as to arrive the 5th of the month.

C. SHIP ORGANIZATION. The ship will provide a helicopter operations bill. The number of personnel engaged in helicopter operations should be kept to a minimum, consistent with safe, efficient operation. Flight operation bills are a follows:

1. OOD: Responsible for conning ship and for the overall supervision of helicopter operations, including setting flight quarters, issuing takeoff and landing clearances, and ensuring ship's readiness.

2. FLIGHT DECK OFFICER: The FDO is stationed aft near the flight deck and has direct control over fire fighting personnel. The FDO is responsible for ensuring a clear flight deck area, including the fantail, the safe and expeditious movement of personnel around the flight deck, and the readiness of fire fighting equipment. The FDO is responsible for telling the OOD when the helicopter is "clear" and when it is "safe on deck" (tied down **and** secure).

3. DAMAGE CONTROL: The helicopter operations damage control team should consist of two personnel under the supervision of the FDO. They should receive formal training in aircraft fire fighting. In the event of an aircraft crash or fire and when directed by the FDO the team will first effect the rescue of the occupants of the aircraft and then control any ensuing fire. Secondary fire protection can be afforded by the ship's damage control/fire fighting squads as organized under the General Emergency Bill.

4. EMERGENCY RESCUE TEAM: When shipboard helicopter operations are conducted beyond autorotative distances from land, a motor boat shall be made ready

for deployment and must be manned by a rescue swimmer.

5. FUELING DETAIL: Consists of one of the members of the flight crew, one person equipped with at least one 15-pound class B fire extinguisher, and the Flight Deck Officer. The helicopter will be fueled only by one of the members of the flight crew.

III. OPERATIONAL LIMITATIONS. This section establishes the operational and meteorological parameters within which helicopter operations are performed.

A. SEA STATE. Flight deck motion results from the combined effects of pitch, roll, yaw and heave. The pilot must evaluate overall deck motion before attempting a takeoff or landing. The determination to conduct or continue operations is a matter of judgement, but when doubt exists as to whether a flight can be made safely it is usually better to cancel or postpone the operation.

1. ROLL. Flight deck roll can produce excessive lateral forces on landing gear and drive train components. After landing, an unrestrained helicopter can tip over when subjected to a lateral angular displacement of 15 degrees from the vertical. To provide an acceptable margin of safety, the maximum permissible roll of the ship during takeoff or landing is 7 degrees from the vertical. This can be measured from the bridge inclinometer or the attitude indicator of the helicopter.

2. PITCH. The maximum acceptable pitch angle is 8 degrees from the horizontal. Pitch angle may need to be more restrictive when encountering excessive roll, yaw, or heave. This can only be measured by the bridge inclinometer.

B. WEATHER. Wind and weather may be limiting factors in mission planning.

1. WIND.

a. Relative wind across the flight deck is a controlling factor in takeoffs and landings. The optimum relative wind is 30 degrees to starboard, but optimum wind may be compromised if the sea state is producing marginal conditions of flight deck motion. Then winds from 350 to 045 degrees relative will be acceptable.

b. True wind is a factor as it affects sea state or as it exceeds the velocity at which an acceptable relative wind can be achieved. The pilot shall

be advised prior to attempting a takeoff or landing of true wind direction and velocity.

c. Helicopter operations are prohibited in relative winds in excess of 25 knots and sea state in excess of four.

2. WEATHER CONDITIONS. Cloud bases at or above 1000 feet AGL and visibility of 3 miles or more permit normal helicopter operations. If lower clouds and/or reduced visibility exist, both FAA and ICAO rules permit helicopter operations if flight can be conducted with one mile flight visibility and clear of clouds, provided that airspeed is such as to avoid obstacles or collision with other aircraft. Aboard ship, the decision whether to fly in conditions or forecasted conditions other than VFR will be made solely by the Aircraft Commander.

C. COMMUNICATIONS.

1. Radio communications must be established and maintained at all times. This will be done primarily with the VHF/FM radio. If it is determined at any time that radio failure has occurred on the helicopter or ship, the mission must cease and landing must be made as soon as possible.

a. If the ship has lost radio contact, the OOD must attempt to reestablish radio contact via FM channel 2 (ship: channel 2), FM channel 4 (ship: channel 82A), VHF 122.92 and 121.5 successively. As a last resort, the ship can transmit via SSB 1790. It must be understood that communicating via SSB radio must be in the blind. The helicopter may hear, but will be unable to respond.

b. If the helicopter has lost radio contact, the pilot must fly back to the ship and circle flashing the landing light to indicate radio failure. Unless limited fuel is a factor, the landing will not be rushed until flight quarters is manned. The ship’s Flight Deck Officer (FDO) will notify the helicopter mechanic when flight quarters is manned. The mechanic will stand in the center of the flight deck and wave over head to indicate “manned and ready”. The pilot will acknowledge with a flash of the landing light, indicating understood and the mechanic will then immediately depart the flight deck. It must be understood that communications should still continue “in the blind” at all times.

2. The ship’s SSB radio can be tuned to 1790 during flight operations if the non-directional beacon (NDB) is not working. The OOD must understand full

operation of the radio. If required during flight operations, an operational check of the ship's SSB radio will be done via the pilot and OOD as soon as the helicopter has reached operational altitude. The pilot will not only ensure a good lock and bearing information, but also that the radio is selected and the volume is turned up enough to be heard in case of radio failure.

IV. PERFORMANCE PLANNING CARD.

A. PROCEDURES.

1. Determine aircraft performance data required for mission completion.

2. When a significant change in the mission's conditions occurs, recompute all affected values. A significant change is defined as an increase of over 5°C OAT or 500 feet PA.

(a) PA. Enter forecast maximum pressure altitude.

(b) OAT. Enter forecast maximum outside air temperature.

(c) TAKEOFF. Enter planned takeoff gross weight.

(d) FUEL. Enter fuel required for the mission.

(e) MAX ALLOWABLE GWT (IGE). Use the appropriate hover ceiling VS Gross Weight chart (pgs. 5-9 to 5-15) to obtain the max GWT IGE.

(f) VNE. Use the appropriate chart in RFM Limitations section Figure 2-6 (pgs. 2-15 to 2-17).

MD-500D PERFORMANCE PLANNING CARD	
DEPARTURE	
Pressure Altitude:	**Fuel:**
Outside Air	**Max Gross Weight:**
Takeoff Gross Weight:	**Vne:**
FUEL MANAGEMENT	
Fuel Onboard:	**Max Endurance:**
Fuel Flow:	
OPTIONAL DATA / REMARKS	

V. CREW MISSION BRIEFING.

A. CREW ACTIONS.

1. The Aircraft Commander has overall responsibility for mission briefings.

2. Crewmembers will direct their attention to the aircrew member conducting the briefing. They will address any questions to the briefer and acknowledge that they understand the assigned actions, duties, and responsibilities.

B. PROCEDURES.

1. Brief the mission using the briefing checklist, figure (1).

2. Identify mission and flight requirements that will demand effective communication and proper sequencing and timing of actions by the crewmembers.

1. Review mission.
2. Flight route, direction of flight and/or flight pattern.
3. Weather: Departure, en route, and return.
4. Required items, mission equipment and personnel.
5. Analysis of the aircraft:
  a. Logbook and preflight deficiencies.
  b. Performance planning.
  c. Mission deviations required based on aircraft analysis.
6. Crew actions, duties, and responsibilities:
  a. Transfer of flight controls (if applicable).
  b. Emergency actions:
    (1) Mission considerations.
    (2) Inadvertent IMC.
    (3) Egress procedures.
7. General crew duties.
  a. Pilot on the controls:
    (1) Fly the aircraft - primary focus outside when VMC.
    (2) Shipboard takeoff - left seat/starboard departure, right seat/port departure.
    (3) Avoid traffic and obstacles.
    (4) Cross-check systems and instruments.
    (5) Monitor/transmit on radios.
  b. Pilot not on the controls (if dual piloted):
    (1) Assist in traffic and obstacle avoidance.
    (2) Tune radios and set transponder.
    (3) Navigate.
    (4) Copy clearances, ATIS, and other information.
    (5) Cross-check systems and instruments.
    (6) Monitor/transmit on radios as directed by the PC.
    (7) Read and complete checklist items as required.
    (8) Set/adjust switches and systems as required.
  c. Observer:
    (1) Assist in traffic and obstacle avoidance.
    (2) Assist in reading checklist as directed by pilot.
8. Questions, comments and acknowledgment of briefing.

Figure (1)

VI. OPERATIONAL PROCEDURES. This section will cover the order and manner in which operations should occur.

A. BEFORE START.

1. 15 minute call-out is determined between the pilot and Principle Investigator (PI). 15 minutes prior to the determined launch time, the pilot will proceed to the helicopter and the PI will call the bridge (OOD) to have the flight quarters announcement made.

2. The bridge (OOD) will make an announcement over the ship’s PA system for flight quarters to be manned and ready in 15 minutes. All non-essential personnel will be required to be forward of station ___ on the ship and no smoking will be allowed until flight quarters has ceased.

3. The Flight Deck Officer (FDO) will notify the bridge when the deck and rescue launch are manned and ready for helicopter operations.

4. When the flight deck is manned and ready, the Pilot at the Controls will radio the bridge to request engine start. The bridge must state, “cleared for engine start, relative winds _____ degrees at ___ knots”, (tailwind component cannot be greater than 15 knots).

B. START. The bridge (OOD) must maintain a steady heading throughout the engine start.

WARNING: Excessive ship motion during engine start or shutdown can cause inadvertent droop stop and blade damage.

WARNING
DO NOT move the cyclic with the pitch and roll of the ship.
DO NOT allow the rotor to dip down to a low position as it could be fatal to deck crews and those exiting the aircraft.

C. TAKEOFF.

1. The bridge will ensure winds are within take-off limits then call to pilot, “relative winds are ___ degrees at ___ knots, true winds are ___ degrees at ___ knots, barometric pressure _____, clear for take-off”. When cleared, increase power and smoothly ascend to a hover height of 5 feet. Check power.

2. Depart in a direction that keeps the ship’s superstructure in sight at all times. Left seat will depart to starboard and right seat will depart to port. Initially slide in the appropriate direction until well clear of deck edge, then turn at a 30 to 45 degree angle relative away from ship’s heading to accelerate. It is critical to slide clear of the ship before accelerating (nose down attitude) due to the helicopter sinking when departing the ship.
3. The Pilot at the Controls.

   a. Primary focus is outside the aircraft to provide obstacle clearance throughout the mission.
   b. Will announce the intended point of landing and any deviation to the approach, to include go-around to the ship.

4. Pilot not at the Controls (dual-piloted).

   a. Will assist in clearing the aircraft and provide

warning of obstacles, unannounced drift, and changes in altitude.

b. Upon clearing the ship, will announce when the attention is focused inside the helicopter. The Pilot at the controls will then focus attention outside the helicopter.

c. During landings, will assist the Pilot at the Controls in ensuring the skids are within the landing deck before touchdown.

D. POWER ASSURANCE CHECK. A power assurance check must be conducted once a week as a minimum. This check must include torque, TOT, N1, oil pressure, pressure altitude, and OAT as a minimum. These parameters will be annotated on the maintenance and flight status document (maintenance log) upon completion of the flight and on a trend analysis sheet (appendix C.). Engine performance trends are critical in single engine shipboard operations. Any downward trends will be brought to the attention of the Maintenance Branch via e-mail with any advisories to the possibility of component or engine change.

E. BEFORE APPROACH. When cleared to land, adjust airspeed as necessary, descend to 200 feet AGL, and enter the landing pattern. When the ship is underway, it will be necessary to make lateral corrections to maintain alignment with the landing deck lineup line. An alternate technique is to lead the ship by initiating the approach to a point forward of the flight deck.

F. DURING THE APPROACH. Cross the deck edge no faster than a brisk walk at an altitude of 5 to 10 feet above the landing surface. Stop aircraft movement over the center of the deck and ensure the skids are within the landing circle.

G. LANDING. In rough seas, attempt to land when the ship is at the apex of a pitch up. Lower the collective and perform a controlled touchdown with the skids inside the landing deck circle. The landing gear will normally be in the forward portion of this circle. When the skids are on the deck, smoothly lower the collective to full down. Maintain the cyclic centered and ignore aircraft motion. Wait for the ship’s motion to steady and nod to the mechanic. The mechanic will wait for a nod from the pilot before entering the rotor arc to tie down and secure the helicopter. The FDO will call to the bridge “helicopter safe on deck” when tied down and secured to the deck. The ship must not turn until the helicopter is safe on deck. **Any turns by the ship from the point of being secured until shutdown must be authorized by the pilot.**

WARNING

DO NOT move the cyclic with the pitch and roll of the ship.

DO NOT allow the rotor to dip down to a low position as it could be fatal to deck crews and those exiting the aircraft.

H. SHUTDOWN. **Do not allow any personnel to disembark until rotor is completely shutdown.** The ship must be steady on course before the throttles can be completely closed. If turns were authorized, wait until completed. At least two minutes will be utilized for cooling down the engines. As per the technical representative for Allison engines, this time can be exceeded with no harm to the engine.

VII. EMERGENCY PROCEDURES.

A. ADF/SSB PROCEDURES. (TO BE AMENDED*) The ship's SSB radio will be tuned to 1790 at all times during helicopter operations and the helicopter ADF will be tuned to 1790. This will provide directional information only. A functional check of the radio will be made when the helicopter is at operational altitude. The mission will be terminated at any time it is determined either the ship's SSB or the helicopter's ADF in not functioning. The ship must key the mike in order for the helicopter to receive a signal. It works best if the ship's OOD gives a "long count". This may have to be done several times to update position information. There is no certified approach using this radio, but there is a makeshift method of recovering in reduced ceiling and visibility. Maintain 300 feet and fly back over to the ship. When over the ship, commence a teardrop approach based on the ship's heading. For example, if the ship is heading 360 degrees, once you have passed over the ship, head 210 for two minutes, the turn back to 045 until you are on the 360 bearing heading inbound. Descend no lower than 100 feet above the highest structure on the ship. If you pass over the ship, commence a teardrop in the opposite direction so as to get the helicopter back in position for another attempt. If the ADF approach method does not work and fuel becomes a consideration, notify the ship of need to do a smoke light approach.

B. SMOKE LIGHT APPROACH. This is an emergency procedure. Every attempt should be made to redirect the ship to better weather, land on shore, etc. This should only be utilized when all other methods of retrieval have been exhausted. It is very dangerous and must be done with extreme caution. Constant communication must occur between the ship and the helicopter and every effort must be made for the ship to "paint" the helicopter on radar. If possible, the helicopter should commence a holding pattern or 360-degree

orbit pattern at 300 feet until the ship can ensure the helicopter is positioned behind the ship. At this point the ship will drop smokes/flares or mark 58 beacon lights every 50 feet over the stern. After the third smoke/flare/light is dropped, the ship will continue 50 feet forward and drop three smokes/flares/lights in succession, continue 50 feet forward and stop, making every attempt to maintain lineup with the dropped smokes/flares/lights. The ship will then notify the helicopter that it is ready, if possible give estimated position from the helicopter off ship's radar. The helicopter will drop to an altitude no lower that 50 feet above the highest structure of the ship and commence an expanding square until a smoke/flare/light is seen. If more than one smoke/flare/light can be found, determine lineup based on ship's heading and continue toward ship's stern. If not, commence expanding square on smoke/flare/light until others are found. Once lineup is determined, slow to minimum controllable airspeed (40 knots?) and descend to 50 feet. When the triple smoke/flare/light is in sight, slow to a brisk walk and look for the stern of the ship. If by the time the helicopter is over the third smoke/flare/light and ship's stern cannot be seen, turn 90 degrees to the right and commence and instrument take off. Ship should make every effort to illuminate the stern, deck and running lights but not with any high intensity light which might blind or cause illusionary affects to the pilot.

VIII. SINGLE PILOT CONSIDERATIONS. The Aircraft Commander is responsible for all crew actions. When conducting single pilot operations, the pilot must limit time focused inside the cockpit; maintaining outside situational awareness is the primary consideration.

IX. OVERWATER CONSIDERATIONS. Over-water flight is characterized by a lack of visual cues and, therefore, has the potential of causing visual illusions. Be alert to any unannounced changes in the flight profile and be prepared to take immediate corrective actions. The radar altimeter low bug should be set to assist in altitude control. Hazards to terrain flight such as harbor lights, buoys, wires, and birds must also be considered during over-water flight.

X. STANDARD EQUIPMENT.

A. EMERGENCY EQUIPMENT (should be on the aircraft at all times):

1. 1 Hand-held fire extinguisher

2. 1 First aid kit

3. 1 Emergency locator transmitter

B. OVER WATER FLIGHTS:

1. 1 life raft sufficient for the total number of personnel on board.

2. Life vests will be worn at all times by each person aboard the helicopter for the duration of the flight when expected to fly over water.

3. HEED bottles will be provided only to personnel with prior training.

C. CREWMEMBER EQUIPMENT:

1. All personnel flying in NOAA aircraft will wear a nomex flight suit and hard-soled shoes, preferably steel-toed.

2. It is also *recommended* that all personnel flying on NOAA aircraft wear head covering and sunglasses.

D. MINIMUM SHIPBOARD EQUIPMENT: The following ship's equipment will be available and serviceable:

1. JP-8 fuel system.

2. Flight deck fire fighting and crash protection equipment, including:
   a. Twin agent unit.
   b. Flight deck CO2 system.
   c. Fire hose equipment, including strainer, Y-gate fitting, hose, all-purpose nozzle, and fog applicator.

3. One rescue boat. While flying a mission, do not allow the ship to utilize the designated rescue boat without properly trained rescue swimmers and equipment aboard it at all times. The rescue boat must remain within sight of the ship and helicopter at all times during flight operations.

XIII. FUEL STATE: The Aircraft Commander must carefully monitor fuel and allow plenty of reserve for unexpected delays in landing on the ship. Radio the ship a minimum of 15 minutes prior to landing to prepare the deck.

APPENDIX (A)

I. SITREPS

A. The following is the proper format for sending sitreps via e-mail:

Subject: SITREP NxxRF

NxxRF - Project Name - Date

Flt #: xx-xxx (if no flight, enter the word "none")
Previous Flt#: xx-xxx (optional if prior flight for today; mandatory if "none" was used above)
Flight: x.x
Block : x.x
Kxxx - Kxxx (origin and destination airports)

(If more than one flight is made in a day, repeat the above block,
except for Previous Flt #)

TT : xxxxx.x (aircraft total time)
Next scheduled maintenance (state type of maint next due) due at xxxxx

Remarks: Brief synopsis of the day's activity, any maintenance comments, plans for tomorrow or next flight, etc.

Aircraft:
Name of facility
Shipping address

ph : xxx-xxx-xxxx
fax: xxx-xxx-xxxx

Crew: Names (ALL CAPS)
Name of Lodging
Shipping address

ph : xxx-xxx-xxxx
fax: xxx-xxx-xxxx

Project Summary: (state project name)
Project Hours Flown: xx.x / xxx.x (hours after the slash are total

hours allotted for the project/FY)

mm/dd - flt. # - x.x
mm/dd - flt. # - x.x
mm/dd - flt. # - x.x
mm/dd - flt. # - x.x

/s/ Your Name

Note: Project summary at bottom should include all flights flown since
the start of the project during the current fiscal year. It should also include any non-project flights flown between project flights.

*Make the following notation on your daily aircraft SITREP:
O = Operating Day: Flights dedicated to projects, training, repositioning for scheduled maintenance, and post maintenance check
flights
R = Mission Ready Day: Aircraft is mission ready and standing by to
support a scheduled project
M = Scheduled Maintenance Day: Aircraft is involved in planned
maintenance inspections and upgrades
U = Unscheduled Maint Day: Aircraft is in maintenance for an unplanned
non-mission related reason or to clear discrepancies
X = Unscheduled Day: Aircraft is ready but not assigned to a project
E = Equipment Transfer Day: Aircraft is involved in modification for a
project or technology upgrade

B. For non-shipboard operations: if unable to send via e-mail, phone in the information to (800)729-6622 X3018 or if out of country use (813)828-3310 X3018. Leave the all

the previous information on the message machine.

APPENDIX (B)

The monthly report that is to be completed via the Excel format and sent as an attachment to the Aircraft Operations Center so as to arrive by the 5th of each month. If it can only be mailed in:

For FEDEX only:
NOAA Aircraft Operations Center
7917 Hangar Loop Drive, Hangar 5
MacDill AFB, FL 33621-5401

Or

For all others:
NOAA Aircraft Operations Center
P.O. Box 6829
MacDill AFB, FL 33608-0829

Dated 10 June 2003

Appendix 4.
Personnel for the Stenella Abundance Research Project 2003
NOAA Ship David Starr Jordan

Jordan Leg 1: San Diego, CA – Manzanillo, Mexico

Position	Name	Affiliation	Berth
Cruise Leader	Bob Pitman	SWFSC	CSSR
Senior Mammal Observer	Richard Rowlett	SWFSC	.
Senior Mammal Observer	Juan Carlos Salinas	AFL	.
Mammal Observer	Erin LaBrecque	AFL	.
Mammal Observer	Anne Douglas	AFL	.
Mammal Observer	Holly Fearnbach	AFL	.
Mammal Observer	.	AFL	.
Seabird Observer	Sophie Webb	AFL	.
Seabird Observer	Chris Hoefer	AFL	.
Oceanographer	Kerry Kopitsky	AFL	.
Oceanographer	Ron Dotson	SWFSC	.
Pilot	David Demers	AOC	.
Helicopter Mechanic	Glen Franke	AOC	.
Photogrammetrist	Morgan Lynn	SWFSC	.
Photogrammetrist	Paula Olson	AFL	.

Jordan Leg 2: Manzanillo, Mexico – Acapulco, Mexico

Position	Name	Affiliation	Berth
Cruise Leader	Bob Pitman	SWFSC	CSSR
Senior Mammal Observer	Richard Rowlett	SWFSC	.
Senior Mammal Observer	Juan Carlos Salinas	AFL	.
Mammal Observer	Erin LaBrecque	AFL	.
Mammal Observer	Anne Douglas	AFL	.
Mammal Observer	Holly Fearnbach	AFL	.
Mammal Observer	.	AFL	.
Seabird Observer	Sophie Webb	AFL	.
Seabird Observer	Chris Hoefer	AFL	.
Oceanographer	Kerry Kopitsky	AFL	.
Oceanographer	Ron Dotson	SWFSC	.
Pilot	David Demers	AOC	.
Helicopter Mechanic	Glen Franke	AOC	.
Photogrammetrist	Jim Gilpatrick	SWFSC	.
Photogrammetrist	Katie Cramer	AFL	.

Jordan Leg 3: Acapulco, Mexico – Puntarenas, Costa Rica

Position	Name	Affiliation	Berth
Cruise Leader	Lisa Ballance	SWFSC	CSSR
Senior Mammal Observer	Richard Rowlett	SWFSC	.
Senior Mammal Observer	Juan Carlos Salinas	AFL	.
Mammal Observer	Erin LaBrecque	AFL	.
Mammal Observer	Anne Douglas	AFL	.
Mammal Observer	Holly Fearnbach	AFL	.
Mammal Observer	.	AFL	.
Seabird Observer	Sophie Webb	AFL	.
Seabird Observer	Chris Hoefer	AFL	.
Oceanographer	Kerry Kopitsky	AFL	.
Oceanographer	Ron Dotson	SWFSC	.
Pilot	Deborah Barr/ Julie Helmers	AOC	.
Helicopter Mechanic	TBD	AOC	.
Photogrammetrist	Jim Gilpatrick	SWFSC	.
Photogrammetrist	Katie Cramer	AFL	.
Visiting Scientist	Bob Pitman	SWFSC	CSSR

Jordan Leg 4: Puntarenas, Costa Rica – San Jose, Guatemala

Position	Name	Affiliation	Berth
Cruise Leader	Lisa Ballance	SWFSC	CSSR
Senior Mammal Observer	James Cotton	SWFSC	.
Senior Mammal Observer	Gary Friedrichsen	AFL	.
Mammal Observer	Ernesto Vazquez	AFL	.
Mammal Observer	Chris Cutler	AFL	.
Mammal Observer	Cornelia Oedekoven	AFL	.
Mammal Observer	Beth Goodwin	AFL	.
Seabird Observer	Michael Force	AFL	.
Seabird Observer	Richard Pagen	AFL	.
Oceanographer	Kerry Kopitsky	AFL	.
Oceanographer	Ron Dotson	SWFSC	.
Pilot	Deborah Barr/ Julie Helmers	AOC	.
Helicopter Mechanic	TBD	AOC	.
Photogrammetrist	Morgan Lynn	SWFSC	.
Photogrammetrist	Charlie Stinchcomb	AFL	.
Visiting Scientist	Bob Pitman	SWFSC	CSSR

Jordan Leg 5: San Jose, Guatemala – Manzanillo, Mexico

Position	Name	Affiliation	Berth
Cruise Leader	Bob Pitman	SWFSC	CSSR
Senior Mammal Observer	James Cotton	SWFSC	.
Senior Mammal Observer	Gary Friedrichsen	AFL	.
Mammal Observer	Ernesto Vazquez	AFL	.
Mammal Observer	Chris Cutler	AFL	.
Mammal Observer	Cornelia Oedekoven	AFL	.
Mammal Observer	Beth Goodwin	AFL	.
Seabird Observer	Michael Force	AFL	.
Seabird Observer	Richard Pagen	AFL	.
Oceanographer	Kerry Kopitsky	AFL	.
Oceanographer	Dave Griffith	SWFSC	.
Pilot	David Demers	AOC	.
Helicopter Mechanic	Glen Franke	AOC	.
Photogrammetrist	Jim Gilpatrick	SWFSC	.
Photogrammetrist	Charlie Stinchcomb	AFL	.

Jordan Leg 6: Manzanillo, Mexico – San Diego, CA

Position	Name	Affiliation	Berth
Cruise Leader	Bob Pitman	SWFSC	CSSR
Senior Mammal Observer	James Cotton	SWFSC	.
Senior Mammal Observer	Gary Friedrichsen	AFL	.
Mammal Observer	Ernesto Vazquez	AFL	.
Mammal Observer	Chris Cutler	AFL	.
Mammal Observer	Cornelia Oedekoven	AFL	.
Mammal Observer	Beth Goodwin	AFL	.
Seabird Observer	Michael Force	AFL	.
Seabird Observer	Richard Pagen	AFL	.
Oceanographer	Noelle Bowlin	AFL	.
Oceanographer	Dave Griffith	SWFSC	.
Pilot	David Demers	AOC	.
Helicopter Mechanic	Glen Franke	AOC	.
Photogrammetrist	Wayne Perryman	SWFSC	.
Photogrammetrist	Erik Eilers	NOAA	.